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Strength; 3.3.4 Elastic Modulus; 3.3.5 Fracture Toughness; 3.4 TOUGHENING MECHANISMS; 3.5 CLOSING REMARKS; REFERENCES; CHAPTER 4: SURFACES AND CONTACTS; 4.1 SURFACE ROUGHNESS; 4.2 SURFACE TOPOGRAPHY AND ASPERITIES; 4.3 REAL CONTACT AREA; 4.4 CONTACT LOAD DISTRIBUTION AND HERTZIAN STRESSES; 4.5 CLOSING REMARKS; REFERENCES; CHAPTER 5: FRICTION; 5.1 INTRODUCTION; 5.2 LAWS OF FRICTION; 5.3 FRICTION MECHANISMS; 5.4 FRICTION OF COMMON ENGINEERING MATERIALS; 5.5 CLOSING REMARKS REFERENCESCHAPTER 6: FRICTIONAL HEATING AND CONTACT TEMPERATURE; 6.1 TRIBOLOGICAL PROCESS AND CONTACT TEMPERATURE; 6.2 CONCEPT OF "BULK" AND "FLASH" TEMPERATURE; 6.3 IMPORTANCE AND RELEVANCE OF SOME READY-TO-USE ANALYTICAL MODELS; 6.4 REVIEW OF SOME FREQUENTLY EMPLOYED READY-TO-USE MODELS; 6.4.1 Assumptions in Various Models; 6.4.2 Model Descriptions and Implications; 6.4.2.1 Archard Model; 6.4.2.2 Kong-Ashby Model; REFERENCES; CHAPTER 7: WEAR MECHANISMS; 7.1 INTRODUCTION; 7.2 CLASSIFICATION OF WEAR MECHANISMS; 7.2.1 Adhesive Wear; 7.2.2 Abrasive Wear; 7.2.2.1 Abrasion of Composites 7.2.3 Fatigue Wear7.2.4 Oxidation and Tribochemical Wear; 7.2.5 Fretting Wear; 7.2.5.1 Fretting Modes; 7.2.5.2 Mechanics of Elastic Contacts under Fretting Conditions; 7.2.5.3 Mechanics of Elastic-Plastic Contacts under Fretting Conditions; 7.2.5.4 Fretting Regimes; 7.2.5.5 Determination of Fretting Regimes; 7.2.5.6 Fretting Maps; 7.2.5.7 Velocity Accommodation in Fretting; 7.2.5.8 Friction Logs; 7.2.6 Solid Particle Erosion; 7.2.6.1 Erosion of Ductile Materials; 7.2.6.2 Erosion of Brittle Materials; 7.3 CLOSING REMARKS; REFERENCES; CHAPTER 8: LUBRICATION; 8.1 LUBRICATION REGIMES
8.2 STRIBECK CURVEREFERENCES; SECTION II: FRICTION AND WEAR OF STRUCTURAL CERAMICS; CHAPTER 9: OVERVIEW: STRUCTURAL CERAMICS; 9.1 INTRODUCTION; 9.2 ZIRCONIA CRYSTAL STRUCTURES AND TRANSFORMATION CHARACTERISTICS OF TETRAGONAL ZIRCONIA; 9.3 TRANSFORMATION TOUGHENING; 9.3.1 Micromechanical Modeling; 9.4 STABILIZATION OF TETRAGONAL ZIRCONIA; 9.5 DIFFERENT FACTORS INFLUENCING TRANSFORMATION TOUGHENING; 9.5.1 Grain Size; 9.5.2 Yttria Content; 9.5.3 Yttria Distribution; 9.6 STRESS-INDUCED MICROCRACKING; 9.7 DEVELOPMENT OF SIALON CERAMICS; 9.8 MICROSTRUCTURE OF S-SIALON CERAMICS
9.10 PROPERTIES OF TITANIUM DIBORIDE CERAMICS

Sommario/riassunto

This book helps students and practicing scientists alike understand that a comprehensive knowledge about the friction and wear properties of advanced materials is essential to further design and development of new materials. With important introductory chapters on the fundamentals, processing, and applications of tribology, the book then examines in detail the nature and properties of materials, the friction and wear of structural ceramics, bioceramics, biocomposites, and nanoceramics, as well as lightweight composites and the friction and wear of ceramics in a cryogenic environment.